Original Article

Health System Preparedness in Provision of Noncommunicable Diseases' Services in Lakhimpur District, Assam State, India

HAP Journal of Public Health and Clinical Medicine
1(1) 44–49, 2023

DOI: 10.1177/jpm.221109874
jpm.hapkerala.org

Susmita Saikia[1], Jonathan Nsamba[1] and Elezebeth Mathews[1]

Abstract

Background: While noncommunicable diseases (NCDs) are one of the leading causes of mortality in the world today, we are unsure of the preparedness of the public health system in terms of provision for and utilization of NCD services in Assam.

Methods: Preparedness of public health facility was assessed using WHO-SARA (Service Availability and Readiness Assessment) tool and Indian Public Health Standards tool. Ethics approval was obtained from the Institutional Human Ethics Committee of the Central University of Kerala.

Results: The overall readiness of primary health centers (PHCs) ranged from 60% to 76% for NCD services, community health centers (CHCs) ranged from 72% to 87%, subdivisional hospitals from 70% to 87%, and district hospitals from 76% to 100%.

Deficiencies were also noted in terms of the availability of equipment and medicines.

Conclusion: The deficiencies in the PHCs and CHCs highlighted in the study emphasize the need to strengthen the health system, thereby strengthening the response of the health system to NCDs in India.

Keywords

Health system preparedness, India, noncommunicable disease, trust in health system, utilization of health service

Introduction

Noncommunicable diseases (NCDs) are one of the major leading causes of premature mortality worldwide.[1] Globally, 71% of all deaths are because of NCDs, and 85% of these premature deaths are recorded in the low middle-income countries.[2] NCDs contribute about 5.87 million (60%) of all deaths in India.[3] According to the Assam disease burden profile, the proportion of total disease burden from NCDs is 51.2%.[4]

In India, the contribution of NCDs to the overall disease burden has increased from 30% in 1990 to 55% in 2016. Major NCDs were cardiovascular diseases, diabetes, chronic respiratory diseases, mental health, chronic kidney diseases, and musculoskeletal disorders.[4]

In Assam, ischemic heart disease ranks at the top followed by chronic obstructive pulmonary diseases (COPD), chronic kidney diseases, and diabetes. The mortality was the highest in the age group of 40 to 69 years, followed by the above 70 years group; however, it was also observed that of the total, 13.6% deaths happened in the age group of 15 to 39 years. NCDs, such as diabetes, COPD, ischemic heart disease, and stroke, as the leading cause of disability-adjusted life years (DALY) from 1990 to 2016 observed an upward shift

According to the World Health Organization (WHO) recommendation, strengthening and reorientation of the health-system is important for prevention and control of NCDs. Recognizing the growing problem, the Ministry of Health and Family Welfare (MOHFW) launched National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) in 2010.[5] Its primary focus is to strengthen public health systems by capacity building for the prevention and control of common NCDs.[5] Later as a concerted effort, the MOHFW launched Ayushman Bharat Health and Wellness Centre which focused on the preventive measures for NCDs encompassing expanded range of services such as

[1] Department of Public Health and Community Medicine, Central University of Kerala, Periye, Kerala, India

Corresponding Author:
Elezebeth Mathews, Department of Public Health and Community Medicine, Central University of Kerala, Periye, Kerala 671316, India.
E-mail: dr.elezebethmathews@cukerala.ac.in

screening, prevention, control, and management of NCDs at the community level.[6]

A study conducted in India in 2019 using the WHO-SARA tool to assess the readiness of health centers to provide NCD services found that health facilities had lack of trained staffs, laboratory services, and essential medicines.[7] The assessment of preparedness of public health facilities is important in ensuring quality service provision.[8] In India, primary healthcare facilities tend to lack optimal human resources, diagnostic equipment, and medicines to treat people with NCDs.[9]

The deficiencies in public health facilities affect the quality of NCD services. Poor quality of health systems was reported to be an important driver of amenable mortality in 84% cardiovascular deaths. This article also argued that reducing death from cancer and chronic respiratory conditions would require laying emphasis on improving the quality of health services.[10] The six building blocks of the health system as suggested by the WHO health system framework suggest that service delivery, health workforce, resources, leadership, financing, etc., are directly related to improvement of health.

The literature on health system capacity to address NCDs in Assam is limited. Therefore, we conducted this study with the following objectives: (a) To assess the general service availability in public facilities to address NCDs in terms of availability of different human resources and infrastructure. (b) To assess specific services' readiness in providing NCD services in terms of national guidelines, training, equipment, and medicines in the district.

Material and Methods

Study Design and Settings

We conducted a facility-based survey in public health facilities, of Lakhimpur district, Assam.

Study Population, Sample Size, and Sampling

There are total 26 primary health centers (PHCs), 8 community health centers (CHCs), 1 subdivisional hospital, and 1 district hospital in Lakhimpur district, Assam (Figure 1). A total of 11 PHCs and 6 CHCs were randomly selected, and 1 subdivisional and 1 district hospital were purposively selected for this survey. Facility-based information was captured by interviewing the key informants such as medical officers, duty doctors, staff nurses, laboratory technicians, and pharmacists using a structured facility assessment form.

Data Collection Tools

The health system preparedness is defined as the availability of guidelines, competent and trained human resources, and availability of equipment, technology, and supplies. A modified questionnaire was used for facility assessment incorporating the validated SARA by the WHO[11] and Indian Public Health Standard (IPHS) facility survey.[12,15] We used the WHO-SARA to understand the service availability and readiness as per international standards, and IPHS facility survey to understand the level of attainment of facilities as per national standards.

In this study, general service availability, referred to the availability of human resources and infrastructure, and specific service availability referred to the presence of national guidelines in the facility, staff training, medicines, and equipment at each level (PHC, CHC, district hospital). General service and specific service availability was assessed based on the IPHS facility survey and the WHO-SARA tool.

Data Analysis

Data analysis was done using IBM SPSS Statistics v.20 (SPSS Inc, Chicago, Illinois, USA).

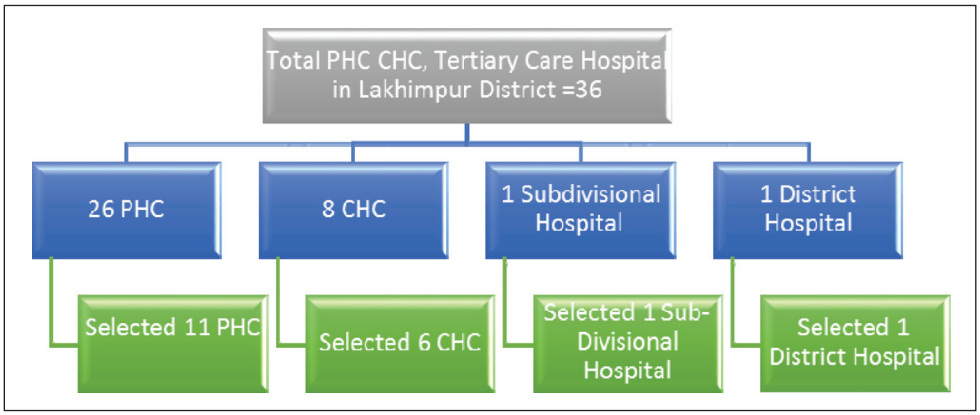

Figure 1. Sampling.

In order to assess general service availability, frequencies and percentages were separately calculated for PHCs, CHCs, subdivision, and district hospitals, and these were assessed in terms of human resources and infrastructure.

For specific service readiness, domain scores and readiness scores were calculated for PHCs, CHCs, 1 subdivisional, and 1 district hospital, and it was assessed in terms of organizational function (national guidelines and training), equipment, and medicines.

Ethical Consideration

Approval to conduct this study was obtained from the Institutional Human Ethics Committee of the Central University of Kerala (Approval number CUK/IHEC/2019/057). Permission to conduct the study on public health facilities was sought from the Joint Director of Lakhimpur district.

Results

For the facility-based survey, a total of 19 public health facilities were sampled out of total 36 facilities.

General Service Availability

Overall availability was lowest in the domains of human resource, equipment, and medicines.

Human Resource

In the human resource domain, all the PHCs had a medical officer; only 9 (81.8%) had a laboratory technician and pharmacist. Among CHCs, all had a medical officer and nursing staff, but there were only 3 (50%) with an obstetrician, 1 (16.6%) with a pediatrician, and 2 (33.3%) that had an anesthetist.

Infrastructure

Hospital infrastructure was assessed for communication, emergency transport, infection control precaution, and inpatient and outpatient services. In this domain, functioning computers and internet facilities were available in all the health-care facilities, and the majority of the health facilities were well equipped for infection control. At primary health care facilities, only 2 (18.2%) had the facility of an ambulance and 8 (72.7%) had inpatient services.

Equipment/Diagnostic Facilities

Out of 11 PHCs, 2 (18.1%) and 5 (45.4%) facilities had provisions for lipid profile and urine dipstick, respectively. Among CHCs, these were available in 3 (50%) and 4 (66.6%) facilities. Only 1 (14.3%) CHC had an electrocardiography machine (ECG).

Medicines

Tab Metformin, an antidiabetic drug was found to be adequate in all health-care facilities. Out of 11 PHCs and 6 CHCs, insulin regular injection was available in only 3 (27.3%) and only 3 (50%) facilities, respectively, while it was available in all subdivisional hospitals. Glibenclamide tab was available in 8 (72.7%) PHC and 4 (66.6%) CHCs.

Beta blocker and calcium channel blockers were found to be adequate in almost all facilities but Angiotensin Converting Enzyme Inhibitor (ACEI) and isosorbide dinitrate were available in 6 (54.5%) and 2 (18.1%) PHCs, respectively. Out of 6 CHCs, ACEI, atorvastatin, isosorbide dinitrate, and epinephrine were available in 5 (83%), 4 (66.6%), and 3 (50%), 0 (0%) facilities, respectively.

Salbutamol inhalers were found to be largely available in subdivision and district hospitals, while these were available in 7 (63.6%) PHCs only. Hydrocortisone injection was available in 3 (27.2%) PHCs and 4 (66.6%) CHCs. Betamethasone inhaler was available in 6 (54.5%) PHCs and 4 (66.6%) CHCs. Aspirin was available in 7 (63.6%) PHCs and 5 (83.3%) CHCs, and not available in district hospital. Mannitol was available in 6 (54.5%) PHCs, 5 (83.3%) CHCs, and the district and subdivisional hospitals.

Specific Service Availability

Under specific service availability, the presence of guidelines and staff training was assessed.

Guidelines and Trained Staff

Out of 11 PHCs, only 6 (54.5%), 8 (72.7%), 7(63.6%), and 5 (45.4%) facilities had management guidelines for diabetes, cardiovascular diseases (CVD), respiratory services, and stroke services, respectively. The staff were trained for diabetes, CVD, respiratory services, and stroke services in 9 (81.8%), 7 (63.6%), 8 (72.7%), and 6 (54.5%) PHC's, respectively.

Out of 6 CHCs, 4 (66.6%) had guidelines for diabetes, respiratory diseases, and stroke, and 3 (50%) had guidelines for stroke. The trained staff for diabetes, respiratory, and stroke services were 5 (83.3%); however, trained staff for CVD was available in all the facilities. At subdivisional hospitals, guidelines for diabetes were found to be inadequate.

Specific Service Domain and Readiness Scores

Domain and readiness scores were calculated using SARA—an annual monitoring system for service delivery implementation.[16] Table 1 summarizes the domain and readiness score for each NCD-related services at each health-care level.

Table 1. Domain and Readiness Score for NCD Services at Public Health Facilities (n = 11 + 6 + 1 + 1).

Categories of Services	Primary Health Centers (PHCs) [n = 11]				Community Health Centers [n = 6]				Subdivisional Hospital [n = 1]				District Hospital) [n = 1]			
	Organizational function[a]	Equipment	Medicines	Overall readiness	Organizational function[a]	Equipment	Medicines	Overall readiness	Organizational function[a]	Equipment	Medicines	Overall readiness	Organizational function[a]	Equipment	Medicines	Overall readiness
Diabetes	63%	70%	66%	69%	74%	79%	72%	78%	50%	80%	66%	70%	100%	80%	100%	93%
Cardiovascular diseases	63%	93%	63%	76%	75%	77%	73%	75%	100%	75%	71%	76%	100%	75%	71%	76%
Respiratory diseases	68%	66%	48%	60%	75%	72%	71%	72%	100%	100%	75%	87%	100%	100%	75%	80%
Stroke	49%	93%	63%	73%	74%	94%	88%	87%	100%	75%	66%	77%	100%	80%	100%	90%

Note: [a] National guidelines and trained staff.

Discussion

The current study showed critical gaps in human resources, infrastructure, equipment, and medicines specifically at the primary (PHC) and secondary (CHC) care levels. In this study, it was found that out of 6 CHCs, obstetrician, pediatrician, and anesthetist were available in 3 (50%), 1 (16.6%), and 2 (33.3%) facilities, respectively. As per IPHS guidelines, specialist physician should be available at secondary health-care level. However, a study conducted in Assam revealed that gynecologists and anesthetists are not available in the First Referral Unit because of which patients are referred to private health facilities.[17] Thus, the nonavailability of specialists pushes patients to seek private health services.

Only 6 (54.5%) PHCs had guidelines for diabetes, while 4 (66.6%) CHCs had guidelines for diabetes and respiratory diseases. The trained staff for diabetes and respiratory services were available in 5 (83.3%) CHCs. The finding was not very different from a study conducted in South India which reported that 1 PHC had guidelines for NCDs and 1 CHC (out of 6) had guidelines for diabetes.[5] Guidelines and training play a vital role in ensuring quality of services and thus community trust in public health-care services.[18]

In our study, out of six CHCs, only 1 (16.7%) of facilities had an ECG and peak flow meter, and inhalers were found to be available in less than 50% in all health-care facilities. The findings are similar to studies conducted in Madhya Pradesh and Bengaluru.[5,19] Inadequate resources lead to patient's negative perception about primary and secondary level health facilities and force them to approach tertiary hospitals, resulting in out-of-pocket expenditure and excess load on tertiary care facilities. In many cases, residents ignore seeking health facilities in the early stages resulting in debilitating terminal illness.[20]

Our study found that insulin injection was available in 3 (27.3%) PHC and 3 (50%)CHC facilities. ACEI was available in 6 (54.5%) PHCs and 5 (83%) CHCs. These findings are similar to the study conducted in Bengaluru which found that insulin regular injection was available in 6 of 3 CHCs and 36 of 4 PHCs.[5] Availability of essential medicines supports expanded range of services, which further facilitates services-seeking and dispensation of medicines as close to communities as possible.[21] It is also an important component in ensuring compliance and continuity of treatment.[22,23]

Conclusion

Preparedness for diagnosis of and management of NCDs at public-health care facilities were found to be suboptimal because of a critical gap in the availability of human resources, infrastructure, equipment, and medicines. Therefore, these deficiencies need to be addressed for efficient uptake of health services and management of chronic diseases to achieve universal coverage and reduction in the burden of NCDs. We found gaps in the achievement of targets at national and international standards in the public health facilities of Assam.

Data were collected only from public health facilities. Further research is recommended for collecting information from private health care facilities for comparison purposes. The study was conducted in one part of Assam, and some of the findings may not apply across regions.

Acknowledgments

Elezebeth Mathews is supported by a Clinical and Public Health Early Career Fellowship (grant number IA/CPHE/17/1/503345) from the Welcome Trust-Department of Biotechnology, India Alliance (2018–2023).

We would like to acknowledge the Joint Director of Health Services, Assam; medical officers; and hospital staff for providing the necessary support in data collection. We would like to thank all study participants for providing the necessary information.

Author Contributions

Susmita Saikia: Conceptualization, investigation, formal analysis, methodology, writing—original draft preparation and review and editing.

Jonathan Nsamba: Writing—original draft preparation and review and editing.

Elezebeth Mathews: Conceptualization, methodology, supervision, validation, writing—review and editing.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

References

1. World Health Organization. *Global Status Report on Noncommunicable Disease*. Published online 2010:161. Accessed May 27, 2022. http://whqlibdoc.who.int/publications/2011/9789240686458_eng.pdf
2. World Health Organization. *Noncommunicable Diseases Country Profiles 2018*. World Health Organization; 2018. Accessed May 27, 2022. https://apps.who.int/iris/handle/1066A5/274512
3. Nethan S, Sinha D, Mehrotra R. Non-communicable disease risk factors and their trends in India. *Asian Pac J Cancer Prev*. 2017;18(7):2005-2010. doi: 10.22034/apjcp.2017.18.7.2005
4. Dandona L, Dandona R, Kumar GA, et al. Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of Disease Study. *Lancet*. 2017;390:2437-2460. doi:10.1016/S0140-6736(17)32804-0
5. World Health Organization. *Global Action Plan for the Prevention and Control of Noncommunicable Diseases*

2013–2020. World Health Organization. Published online 2013. Accessed May 27, 2022. https://apps.who.int/iris/bitstream/handle/10665/94384/?sequence=1

6. Government of India. *Ayushman Bharat: National Health Protection Mission*. National Portal of India. Accessed June 28, 2022. https://www.india.gov.in/spotlight/ayushman-bharat-national-health-protection-mission
7. Parameswaran K, Agrawal T. Readiness of primary health centres and community health centres for providing noncommunicable diseases-related services in Bengaluru, South India. *Int J Noncommun Dis*. 2019;4(3):73. doi: 0.4103/jncd.jncd_45_18
8. Ahir G. Assessment of facility-level preparedness at primary and secondary health care levels for prevention and control of non-communicable diseases. *Natl J Integr Res Med*. 2018;9(6):36-39.
9. Elias MA, Pati MK, Aivalli P, et al. Preparedness for delivering non-communicable disease services in primary care: access to medicines for diabetes and hypertension in a district in south India. *BMJ Glob Health*. 2018;2(Suppl 3):e000519. doi: 10.1136/bmjgh-2017-000519.
10. Kruk ME, Gage AD, Arsenault C, et al. High-quality health systems in the sustainable development goals era: time for a revolution. *Lancet Glob Health*. 2018;6(11):e1196-e1252. doi: 10.1016/S2214-109X(18)30386-3
11. WHO. *Service Availability and Readiness Assessment of the Public Health Facilities in Libya, 2017*: *SARA Libya 2017—Full Report*. Published online 2017. Accessed May 27, 2022. https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/assessments/service_availability_and_readiness_assessment_final_12-03-2018.pdf
12. Directorate General of Health Services Government of India M of H& FW. *Indian Public Health Standards (IPHS) Guidelines for Primary Health Centres*. Published online 2012:100. Accessed May 27, 2022. https://nhm.gov.in/images/pdf/guidelines/iphs/iphs-revised-guidlines-2012/primay-health-centres.pdf
13. Directorate General of Health Services Government of India M of H& FW. *Indian Public Health Standards (IPHS) Guidelines of Community Health Centres*. Published online 2012:94. Accessed May 27, 2022. https://nhm.gov.in/images/pdf/guidelines/iphs/iphs-revised-guidlines-2012/community-health-centres.pdf
14. Directorate General of Health Services Government of India M of H& FW. *Indian Public Health Standards (IPHS) Guidelines for Sub-District/Sub-Divisional Hospitals*. Published online 2012:102. Accessed May 27, 2022. https://adc.bmj.com/sites/all/libraries/pdfjs/web/viewer.html?file=/content/archdischild/74/5/437.full.pdf
15. Directorate General of Health Services Government of India M of H& FW. *Indian Public Health Standards (IPHS) Guidelines for District Hospitals*. Published online 2012:124. Accessed May 27, 2022. https://nhm.gov.in/images/pdf/guidelines/iphs/iphs-revised-guidlines-2012/district-hospital.pdf
16. WHO. *Service Availability and Readiness Assessment (SARA): An Annual Monitoring System for Service Delivery*. Published online 2015:65. Accessed May 27, 2022. https://apps.who.int/iris/bitstream/handle/10665/149025/WHO_HIS_HSI_2014.5_eng.pdf?sequence=1&isAllowed=y
17. Devi N. Status of public health care delivery system: a case study of Nagaon and Nalbari Districts of Assam (India). *Indian J Public Health Res Dev*. 2018;9(8):68-72. doi: 10.9790/0837-2210124248
18. World Health Organization. *Delivering Quality Health Services: A Global Imperative for Universal Health Coverage*. OECD Publishing. Published online July 5, 2018. Accessed May 27, 2022. https://apps.who.int/iris/bitstream/handle/10665/272465/9789241513906-eng.pdf
19. Pakhare A, Kumar S, Goyal S, Joshi R. Assessment of primary care facilities for cardiovascular disease preparedness in Madhya Pradesh, India. *BMC Health Serv Res.* 2015;15(1):1-8. doi: 10.1186/s12913-015-1075-x
20. Anselmi L, Lagarde M, Hanson K. Health service availability and health seeking behaviour in resource poor settings: evidence from Mozambique. *Health Econ Rev*. 2015;5(1):1-13. doi: 10.1186/s13561-015-0062-6
21. Ayushman Bharat. *Comprehensive Primary Health Care through Health and Wellness Centres: Operational Guidelines.* NHSRC; 2018. Accessed May 27, 2022. https://www.nhm.gov.in/New_Updates_2018/NHM_Components/Health_System_Stregthening/Comprehensive_primary_health_care/letter/Operational_Guidelines_For_CPHC.pdf
22. Horne R, Weinman J, Barber N, et al. *Concordance, Adherence and Compliance in Medicine Taking: Report for the National Co-Ordinating Centre for NHS Service Delivery and Organisation R & D (NCCSDO)*. NCCSDO; 2005. Accessed May 27, 2022. ahpo.net/assets/NCCSDO%20Compliance%202005.pdf
23. Johansson E, Diwan VK, Huong ND, Ahlberg BM. Staff and patient attitudes to tuberculosis and compliance with treatment: an exploratory study in a district in Vietnam. *Tuber Lung Dis*. 1996;77(2):178-183. doi: 10.1016/s0962-8479(96)90035-0